**MODULATOR**

**Control centre responsible for processing information received from receptor & sending information to effector**

**Hypothalamus reduces nervous stimulation to Posterior pituitary to reduce amount of ADH released.**

**STIMULUS**

**Change in the environment that causes system to operate. (Above or below the normal).**

**Osmotic pressure decreases. Water concentration in blood increases.**

**RECEPTOR**

**Detects change**

**Osmoreceptors in hypothalamus**

**HIGH WATER CONCENTRATION IN THE BLOOD**

**EFFECTOR**

**Carries out response counteracting effect of stimulus**

**Distal convoluted tubules (DCT) and Collecting duct (CT) of nephron in the kidneys.**

**FEEDBACK**

**Achieved because original stimulus has been changed by the response**

**Increase in osmotic pressure. Decrease in water concentration in blood. Negative feedback has occurred. Original stimulus reduced/eliminated.**

**RESPONSE**

**Action and processes (mechanism) of the effector**

**Decrease in permeability of DCT & CT. Less water reabsorbed into blood. More urine produced. Urine is less concentrated.**

**Osmotic pressure increases. Water concentration in blood decreases.**

**MODULATOR**

**Control centre responsible for processing information received from receptor & sending information to effector**

**Hypothalamus via nervous conduction stimulates Posterior pituitary to increase amount of ADH released.**

**STIMULUS**

**Change in the environment that causes system to operate. (Above or below the normal).**

**Osmotic pressure increases. Water concentration in blood decreases.**

**RECEPTOR**

**Detects change**

**Osmoreceptors in hypothalamus**

**LOW WATER CONCENTRATION IN THE BLOOD**

**EFFECTOR**

**Carries out response counteracting effect of stimulus**

**Distal convoluted tubules (DCT) and Collecting duct (CT) of nephron in the kidneys.**

**FEEDBACK**

**Achieved because original stimulus has been changed by the response**

**Decrease in osmotic pressure. Increase in water concentration in blood. Negative feedback has occurred. Original stimulus reduced/eliminated.**

**RESPONSE**

**Action and processes (mechanism) of the effector**

**Increase in permeability of DCT & CT. More water reabsorbed into blood. Less urine produced. Urine is more concentrated.**

**Osmotic pressure decreases. Water concentration in blood increases.**

**MODULATOR**

**Control centre responsible for processing information received from receptor & sending information to effector**

**Thirst centre of the hypothalamus stimulated**

**STIMULUS**

**Change in the environment that causes system to operate. (Above or below the normal).**

**Osmotic pressure increases. Water concentration in blood decreases. Decreased flow of saliva (dry mouth).**

**RECEPTOR**

**Detects change**

**Osmoreceptors in thirst centre of hypothalamus AND**

**receptors in the mouth**

**THIRST REFLEX**

**EFFECTOR**

**Carries out response counteracting effect of stimulus**

**Cerebrum/cerebral cortex activates drinking behaviour = conscious decision to have a drink.**

**Skeletal Muscles = perform action of drinking**

**FEEDBACK**

**Achieved because original stimulus has been changed by the response**

**Decrease in osmotic pressure. Increase in water concentration in blood. Sensation of thirst ceases. Negative feedback has occurred. Original stimulus reduced/eliminated.**

**RESPONSE**

**Action and processes (mechanism) of the effector**

**Person has a drink. Water is absorbed into blood stream from alimentary canal.**

**Water concentration in blood increases. Osmotic pressure decreases.**

**MODULATOR**

**Control centre responsible for processing information received from receptor & sending information to effector**

**Respiratory centre in medulla oblongata & pons**

**STIMULUS**

**Change in the environment that causes system to operate. (Above or below the normal).**

**Increase in level of CO2**

**(= low pH, high H+ conc., low O2)**

**RECEPTOR**

**Detects change**

* **Central chemoreceptors in medulla oblongata (CO2)**
* **Peripheral chemoreceptors in aortic & carotid bodies (pH)**

**HIGH CARBON DIOXIDE**

**EFFECTOR**

**Carries out response counteracting effect of stimulus**

**Respiratory muscles:**

* **Intercostal muscles (internal & external) via intercostal nerve**
* **Diaphragm via phrenic nerve**

**FEEDBACK**

**Achieved because original stimulus has been changed by the response**

**Reduce levels of CO2 in blood (increase pH, reduce H+ conc., increase in O2)**

**Negative feedback occurred, original stimulus reduced/eliminated.**

**RESPONSE**

**Action and processes (mechanism) of the effector**

**Increase in rate & depth of breathing.**

**(Muscles contract more forcefully & frequently)**

**MODULATOR**

**Control centre responsible for processing information received from receptor & sending information to effector**

**Respiratory centre in medulla oblongata & pons**

**STIMULUS**

**Change in the environment that causes system to operate. (Above or below the normal).**

**Decrease in level of CO2**

**(= high pH, low H+ conc., high O2)**

**RECEPTOR**

**Detects change**

* **Central chemoreceptors in medulla oblongata (CO2)**
* **Peripheral chemoreceptors in aortic & carotid bodies (pH)**

**HIGH CARBON DIOXIDE**

**EFFECTOR**

**Carries out response counteracting effect of stimulus**

**Respiratory muscles:**

* **Intercostal muscles (internal & external) via intercostal nerve**
* **Diaphragm via phrenic nerve**

**FEEDBACK**

**Achieved because original stimulus has been changed by the response**

**Increase levels of CO2 in blood (decrease pH, increase H+ conc., increase in O2)**

**Negative feedback occurred, original stimulus reduced/eliminated.**

**RESPONSE**

**Action and processes (mechanism) of the effector**

**Decrease in rate & depth of breathing.**

 **(Muscles contract less forcefully & frequently)**